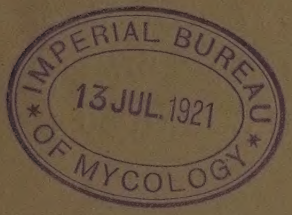
FLORA W. PATTERSON.

GRAIN SMUTS: THEIR CAUSES AND TREATMENTS.

Mel. T. Cook.



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GRAIN SMUTS: THEIR CAUSES AND TREATMENTS.*

The smuts are among the most injurious diseases of our grains, and are the causes of heavy losses in New Jersey and throughout the country. The most important of the grain smuts are the loose smut of oats, the loose smut of wheat, the stinking smut or bunt of wheat and the smut of corn. These diseases are all due to fungi which are very similar in general appearance and behavior, but which have different life histories and, therefore, require different treatments to insure their control.

Loose Smut of Oats.

(Ustilago avenæ (Pers.) Jens.)

This very common and well known disease occurs on the growing oats at the time of heading, causing the destruction of the grains and more or less of the chaff and the formation of a powdery black mass. This black powder is composed of the spores of the fungus by which it is carried from year to year. It is carried by the wind and more or less of it catches on the grains of the healthy plants. The loss due to this disease is very large, frequently amounting to 10% or more of the crop. The loss for the entire United States has been estimated at $20,000,000 per year.

Treatment. The fact that the spores of the fungus are carried on the outside of the healthy grains makes it possible to use a treatment which will kill the spores without injuring the grains. The most convenient treatment is with formalin (or formaldehyde) which can be purchased from the druggist at 75 to 90 cents per pound, or in large quantities much cheaper. One pound in 50 gallons of water will be sufficient for 50 bushels of grain. Spread the grain on a clean floor and sprinkle or spray thoroughly with the

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*Prepared by Mel. T. Cook, Ph.D., Plant Pathologist, New Jersey State Experiment Station.

solution. Shovel the grain into a pile and cover with canvas or burlap for from six to twelve hours and then spread out to dry. The drying process may be hastened by mixing with air-slaked lime, which may be removed by the fanning mill. There are other treatments, but none more satisfactory, convenient or economical than the formalin. The fumes of the formalin are irritating to the nose and eyes, but not injurious.

Loose Smut of Wheat.

(Ustilago tritici (Pers.) Jens.

This disease of the wheat is very similar in general appearance to that of the oats, but its life history is somewhat different. It spreads from diseased to healthy plants at time of flowering and penetrates the young grains.

Treatment. The fact that it is carried within the grain instead of on the outside and that it is impossible to distinguish the healthy from the diseased grains, makes the formalin treatment unsatisfactory. By far the most satisfactory and economical method of preventing the desease is to secure seed from uninfected fields, but when it is desirable to maintain a particular strain of seed, a modification of the Jensen hot water treatment can be used. This method as devised by Freeman and Johnson is as follows: Clean the seed thoroughly and soak for 5 to 7 hours in water at 63° to 72° Fahrenheit. Put the grain in loose bags or wire baskets holding about one-half peck each for further treatment. Use two galvanized iron tubs, holding from 20 to 40 gallons, filled with water. Tub No. 1 should be kept at a temperature ranging from 110° to 120° Fahrenheit, and tub No. 2 at about 126° to 129° Fahrenheit. Plunge each bag or basket into tub No. 1 for one minute and then into tub No. 2 for ten minutes, keeping the grain well stirred during the entire time. Two men can treat about one bushel of grain per hour. The seed can be dried on a barn floor, but if the weather is cool it should be protected from frost.

The slowness of the hot water treatment makes it impracticable to treat any considerable amount of grain. However, the grower will find it practicable to treat a small amount of seed which can be sown in aseparate field and the crop used for seed a second year. Such a field should be at a considerable distance from wheat known to be infected, or should be separated by a woodland or other wind-break to prevent infection by means of spores carried by the wind.

Stinking Smut or Bunt of Wheat.

(Tilletia fœtans (B. & C.) Trel.)

(Tilletia tritici (Beij.) Wint.)

This disease is quite different in appearance from the loose smut. It fruits in the grain only, and therefore is frequently not noticed until threshing time. The diseased grains are frequently shriveled, greenish in color, and when broken are found to be filled with a mass of black spores which have a peculiar, disagreeable odor. The fungus not only destroys the grain of the diseased plants, but the diseased grains are mixed with the healthy, thus making the entire crop worthless for milling and frequently for stock feed.

Treatment. The spores of the fungus are carried on the outside of the grain and attack the young plants. This makes it possible to treat the seed with formaldehyde in exactly the same manner as recommended for the treatment of oats for loose smut.

Corn Smut.

(Ustilago Zeæ (Beckm.) Ung.)

This very common disease is well known by the black masses of spores on the ears, tassels and frequently on stalks and leaves. It occasionally causes heavy losses in field corn and is frequently very destructive on sweet corn. During the past season it was found to be very severe in two localities in this State. The spores of the fungus are carried from season to season in the old stalks, in the manure from livestock fed on the diseased plants, and possibly on the grain.

Treatment. Do not use manure from animals fed on diseased plants on corn land. Burn the refuse from fields where the disease is prevalent. Practice crop rotation.